

41 has begun charging such that, through display of the image
42 data, a user is informed that the image data has been
43 recorded on the medium.

REMARKS

In view of both the amendments presented above and the following discussion, the Applicants submit that none of the claims now pending in the application is obvious under the provisions of 35 USC § 103. Thus, the Applicants believe that all of these claims are now in allowable form.

If, however, the Examiner believes that there are any unresolved issues requiring adverse final action in any of the claims now pending in the application, the Examiner should telephone Mr. Peter L. Michaelson, Esq. at (732) 530-6671 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Status of pending claims

Independent claims 1, 7 and 11 have all been amended to more precisely define the present invention than did these claims, as they stood prior to this amendment.

Rejections under 35 USC § 103

A. Claims 1-10

The Examiner has rejected claims 1-10, as they stood prior to this amendment, under the provisions of 35 USC § 103 as being obvious over the teachings of the

Anderson et al patent (United States patent 5,963,255 issued to E. C. Anderson et al on October 5, 1999). In view of the amendments now made to independent claims 1 and 7, this rejection is respectfully traversed. For simplicity, this rejection will be primarily discussed in the context of claim 1.

The Examiner notes that the Anderson et al patent discloses several limitations that existed in claim 1, as it stood prior to this amendment. As to the system controller, the Examiner, with reference to col. 2, lines 55-60, Figures 3 and 4 and col. 5, lines 54-57 of this patent, states that this patent teaches the concept of controlling a camera such that "when the voltage of the battery falls below a predetermined value (5.2 v), the camera shuts down power to some of the components in the system". In this regard, the Examiner is quite correct. The Examiner specifically notes that the camera, operating in one mode, particular Power State 3, completely shuts down flash charging while the camera may still take images and thus could still display images. In another mode, so says the Examiner, flash charging is lessened and camera image processing and other functions are allowed to be implemented, such as display. Hence, the Examiner concludes that the Anderson et al patent clearly teaches the concept of "powering down individual circuits which have a great deal of influence on battery drain, such as [sic] flash, processing and display to increase the longevity of the battery/power supply." Again, the Examiner is correct in her thinking.

The Anderson et al patent is clearly concerned with conserving battery power, and hence prolonging usable life of the camera as the camera battery becomes increasingly depleted of its stored energy. To accomplish this result, this patent teaches the concept of powering off an incrementally larger number of specific camera systems and in a predefined order, based on monitored battery voltage, as the battery further depletes its charge. The Examiner correctly notes that such a power management approach does indeed reflect efficient use of stored energy.

With those general views in mind, the Examiner points to specific express and also implicit teachings in the power management scheme taught by the Anderson et al patent which she believes render the invention, as recited in claim 1, as it stood prior to this amendment, obvious. As the Examiner will shortly see, this conclusion would be quite incorrect when viewed in the context of claim 1, as it presently stands.

Specifically, the Examiner points to camera operation in Power States 1, 3 and 4. The Examiner opines that when a camera operates in Power States 3 and 4, power to a flash unit is first terminated, by a power management system, but other systems of the camera will still be powered and may continue to operate. However, when the camera enters Power State 1, which may occur at a battery voltage, of illustratively 5.2 volts, provided all image processing is completed by then, the power management system initiates a power down sequence which culminates in a total "power failure". See, e.g., col. 7, line 23 et seq of this patent.

Based on the operation of the camera in Power States 3 and 4, the Examiner implicitly recognizes that, inasmuch as some camera systems remained powered while the flash is de-energized, the camera could still record and display an image. This recognition is based on her apparent belief that since other non-flash systems within the camera would remain operational in Power States 3 and 4, then those systems could include image display and recording.

Rather than repeat the general discussion of the teachings of this patent, for the sake of brevity, the Applicants will once again simply direct the Examiner's attention to the Applicants' prior amendment dated January 26, 2000 for that discussion.

As to Power States 3 and 4, the Anderson et al patent expressly states in col. 7, line 29 et seq -- the same citation specifically made by the Examiner:

"In Power State 4 the flash unit 66 is configured so that it may only operate in a reduced-power charging mode. Alternatively, Power State 4 may also include other power reduction techniques. In Power State 3 the flash unit 66 is shut-down so as not to consume any power, however the camera 10 may still capture additional images. Alternatively, Power State 3 may also include additional power

reduction techniques, such as running only one of the motors 46 at a time."

Image capture is described in col. 4, line 45 et seq in the context of the functionality of capture electronics 32, illustrated in Figures 1 and 2, as being that of electrically sensing the image and generating digital signals representing scanned pixels. In particular, col. 4, line 45 et seq expressly states:

"The capture electronics 32 are disposed in coaxial alignment with the optical path 28, and are positioned to receive filtered light containing image date from the filter 24. The capture electronics 32 preferably receive control signals on line 36 from the signal processing unit 16 for controlling the focus, exposure and color balance of the camera 10. ... The capture electronics 32 in turn generate image data sent to the signal processing unit 16 over line 36. Lastly, the capture electronics 32 are coupled to receive electronic power and control signals over power bus 68 from the power supply unit 17. If the capture electronics 32 receive a capture electronics shut-down signal on the power bus 68 from the computer 20,

the capture electronics 32 will shut down and no longer consume power."

Image storage occurs in a totally separate unit from image capture electronics 32, i.e., specifically computer 20 shown in Figures 1 and 4. As expressly noted in col. 6, line 47 et seq, computer 20 contains, as one of its constituent components, memory card 52 which is described as "preferably a non-volatile flash memory card for storing captured and processed image data".

Now, with respect to Power State 2, this patent expressly states in col. 7, line 37 et seq:

"In Power State 2 the image capture unit 14 and the signal processing unit 16 are shut-down, preventing the camera 10 from capturing any additional images, but permitting the computer 20 to complete any outstanding image processing functions."

Since images are stored within computer 20 and particularly on memory card 52, then image recording likely constitutes an image processing function undertaken by the computer -- an operation that can occur during Power State 2.

Hence, if the power management system operates the camera in Power State 3, then the camera can capture an image. But, as the battery power continues to degrade, then once Power State 2 is invoked, the capture electronics will

be shut-down with the effect that no further images can be captured. However, during Power State 2, computer 20 can apparently still record an image captured during immediately preceding Power State 3 but, as of yet, not recorded to complete any remaining image processing operations.

Thus, to this extent, the camera, while operating in Power States 3 and then 2, appears to have the ability to record an image while the flash unit remains off.

But, even with this capability, a fundamental problem remains in the camera taught by the Anderson et al patent (as with many conventional digital still cameras) -- a problem which the present Applicants advantageously, simply and very effectively solve!

Specifically, as the Applicants clearly describe, as more systems in a digital still camera are simultaneously operated, the load on the camera battery increases and the battery voltage decreases. If, as a result of extended use, the battery has been sufficiently discharged, then any subsequent relatively heavy load, such as charging of a flash capacitor, may cause the battery voltage to decrease below a value at which the digital electronics in the camera will cease to properly operate. When this occurs, any image that has been scanned and stored in a frame store memory but not yet recorded by the camera onto a non-volatile recording media, such as a flash memory card, will simply be lost.

Consequently, a user may later find that a picture (s)he thought was captured was in fact not recorded -- simply because the battery sufficiently exhausted its power

while charging the flash. In this instance, the user would have no knowledge that the image was lost until (s)he tried to access it sometime later. Hence, depending on the circumstances involved, the user could well irretrievably lose a picture that could not easily, if at all, be re-taken; thus causing significant displeasure and inconvenience.

Therefore, a need exists to readily confirm to a user that a digital still camera, while operating in a power saving mode and but prior to commencing flash charging, has, in fact, recorded a picture onto the media.

Nowhere does the Anderson et al patent provide any teachings, whether explicit or by implication -- even through the slightest suggestion, as to: (a) that such an indication would even be useful, and (b) how to provide it. This, of course, is not surprising since the Anderson et al patent is totally oblivious to this problem.

In fact, under the multi-state power management protocol described in the Anderson et al patent, the problem would never arise. The simple reason is that, as taught by the Anderson et al patent, the flash unit would be de-energized in Power State 3 before a scanned image would be recorded in Power State 2 and then remain de-energized throughout Power States 2 (while the image was ostensibly being recorded) and 1, and until such time as the camera battery has been sufficiently recharged to restore adequate (e.g. full) power to the camera (e.g. re-set the power management circuitry to assume Power State 5). In sharp contrast, the time-staggered operation of the present

invention permits the flash capacitor to be recharged after an image has been recorded -- an operation that does not occur in the Anderson et al methodology.

To effectively remedy this problem by providing simple, useable confirmation of image recordal to a user, the present Applicants teach that, during a power saving operation, an image is displayed simultaneously with its recording onto the medium but ceases to be displayed only after that image has been fully recorded. Such cessation occurs prior to initiating charge of the flash unit. Therefore, through the present invention, not only is battery power conserved by not energizing an LCD camera monitor while the flash unit is being charged, but equally importantly, the user, from the mere act of seeing the image disappear, gains confirmation that the camera has recorded the image onto the non-volatile recording medium. Such confirmation is simple, yet very effective to users. Consequently, a loss of a scanned image by virtue of a sufficient drop occurring in the battery voltage during flash recharge -- which occurs in conventional digital cameras, is eliminated through the present invention.

Given the complete and utter dearth of teachings in the Anderson et al patent directed at recognizing, let alone solving, this problem, the Applicants submit that this patent would totally fail to lead any one of skill in the art, when faced with this problem, to the Applicants' inventive solution.

Now, assuming arguendo, that such a person were, for some unknown reason, to even turn to this patent for

guidance, this patent, by teaching that image storage could occur after the flash unit was totally de-energized, simply stops well short of even recognizing the specific camera operation that, in the first instance, gives rise to the problem which the Applicants now advantageously and effectively solve. In that regard, this operation runs directly counter to the specific power down methodology expressly delineated in this patent, i.e. termination of flash operation during Power State 3 followed by possible image recording of a scanned image during Power State 2.

Independent claim 1, as it now stands, contains suitable recitations directed at the distinguishing aspects of the present invention. In that regard, claim 1 recites as follows, with these distinguishing recitations shown in a bolded typeface:

"An electronic camera comprising:
a signal processing portion for
processing an imaged video signal
obtained from an imaging element to form
image data;
a monitor for displaying said image
data;
an electronic flash device;
a battery for supplying voltage to
said signal processing portion, said
monitor and said electronic flash
device;
a battery voltage detector circuit;
and
a system controller;

wherein:

 said electronic flash device includes a capacitor charged when no light is emitted from the flash device, and a discharge tube which receives an output from capacitor and, in response thereto, emits light; and

 said system controller receives an output from said battery voltage detector circuit, determines whether an amount of electric charge remaining in said battery is below a predetermined value, and controls displaying on said monitor and charging of said capacitor such that, when the amount of electric charge remaining in said battery is below said predetermined value, display of the image data and charging of the capacitor are not simultaneously performed and an operation of displaying the image data on the monitor and recording the image data on a recording medium is completed before an operation of charging the capacitor occurs so that the image data will be preserved on the medium should the battery voltage, as a result of the charging operation, decrease below a level at which the camera would record the image, wherein the image data is displayed on the monitor after the image

has been recorded but before the capacitor has begun charging such that, through display of the image data, a user is informed that the image data has been recorded on the medium." [emphasis added]

Independent claim 7 contains similar distinguishing recitations. The Applicants have now amended claims 1 and 7 (as well as claim 11, discussed hereinbelow) to more clearly delineate their present invention than did these claims as they existed prior to this amendment.

As such, the Applicants submit that neither of independent claims 1 and 7, as they now stand, is rendered obvious in view of the teachings in the Anderson et al patent. Hence, both of these claims are patentable under the provisions of 35 USC § 103.

Each of dependent claims 2-6 and 8-10 depends from claims 1 and 7, respectively, and recites further distinguishing aspects of the present invention.

Accordingly, the Applicants submit that each of these dependent claims is patentable under the provisions of 35 USC § 103 over the teachings in the Anderson et al patent for the exact same reasons set forth above.

B. Claims 11-12

The Examiner has rejected claims 11 and 12, as they stood prior to this amendment, under the provisions

of 35 USC § 103 as being obvious over the teachings of the Anderson patent taken in view of those in the Kare et al patent (United States patent 5,541,656 issued to S. D. Kare et al on July 30, 1996). In view of the amendments now made to independent claim 11, this rejection is also respectfully traversed.

To the extent relevant, the Kare et al patent, as the Examiner correctly notes, teaches a hand-held CCD camera that does not take a picture until the flash has been fully charged. See, e.g. col. 5, line 46 et seq of this patent. This operation widely differs from that which gives rise to the present invention; namely, that an image is first taken followed by flash being charged rather than, as in the Kare et al patent, the reverse.

Therefore, any combination of the teachings of the Anderson et al and Kare et al patents would still result in camera operation that suffers the exact same deficiency which the present Applicants now solve, i.e. image loss caused by a decrease in battery voltage that arises from charging a flash using a sufficiently discharged camera battery. The Kare et al patent, like the Anderson et al patent, simply fails to recognize this problem, let alone provides any guidance as to how one skilled in the art should solve it.

Given this, the Applicants submit that their present invention is not obvious over the teachings in both the Anderson et al and Kare et al patents for the same reasons, as discussed above, that their invention is not

obvious over the teachings in the Anderson et al patent alone.

Independent claim 11, as it now stands, contains suitable recitations (similar though narrower to those recited in independent claims 1 and 7, as discussed above) directed at the distinguishing aspects of the present invention. In particular, claim 11 recites as follows, with its distinguishing recitations shown in a bolded typeface:

"An electronic camera comprising:
an operation key;
a signal processing portion for
processing an imaged video signal
obtained from an imaging element to form
image data and storing said image data
on a recording medium in response to
operation of said operation key;
a monitor for displaying said image
data thereon;
an electronic flash device;
a battery for supplying voltage to
said signal processing portion, said
monitor and said electronic flash
device;
a battery voltage detector circuit
connected to said battery; and
a system controller connected to
said battery voltage detector circuit,
said monitor, said signal processing
portion and said electronic flash
device;
wherein:

said electronic flash device has a capacitor charged with current supplied from said battery when said electronic flash does not emit a flash of light, and a discharge tube which receives an output from said capacitor and, in response thereto, produces the flash of light; and

 said system controller receives an output from said battery voltage detector circuit and determines whether a remaining amount of electric charge in the battery is below a predetermined value, and, if the remaining amount of the charge is below the predetermined value, does not permit displaying on said monitor and charging of said capacitor to occur simultaneously, such that the system controller prevents the capacitor from being charged while the monitor is displaying the image data when one screen of the image data is being recorded on the recording medium, and controls the monitor to be inoperative while said capacitor is being charged after one screen of said image data has been completely recorded on the recording medium so that the image data will be preserved on the medium should the battery voltage, as a result of the

charging operation, decrease below a level at which the camera would record the image, wherein the image data is displayed on the monitor after the image has been recorded but before the capacitor has begun charging such that, through display of the image data, a user is informed that the image data has been recorded on the medium." [emphasis added]

As such, the Applicants submit that claim 11, as it now stands, is not rendered obvious in view of the teachings in the Anderson et al and Kare et al patents, whether taken singly or in any combination, including that posed by the Examiner. Hence, this claim is patentable under the provisions of 35 USC § 103.

Dependent claim 12 depends from claim 11 and recites further distinguishing aspects of the present invention.

Accordingly, the Applicants submit that claim 12 is patentable under the provisions of 35 USC § 103 over the teachings in these two patents for the exact same reasons as is claim 11.

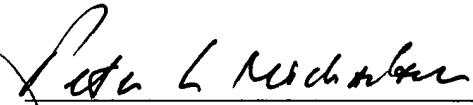
Conclusion

Thus, the Applicants submit that none of the claims, presently in the application, is obvious under the provisions of 35 USC § 103.

Consequently, the Applicants believe that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

Respectfully submitted,

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Peter L. Michaelson, Attorney
Reg. No. 30,090
Customer Number: 007265
(732) 530-6671

MICHAELSON & WALLACE
Counselors at Law
Parkway 109 Office Center
328 Newman Springs Road
P.O. Box 8489
Red Bank, New Jersey 07701

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